PAST

PERTH AEROSPACE STUDENT TEAM

ONBOARDING HANDBOOK

Contents

Lab Safety

- PAST prioritises the safety and wellbeing of members above all else.
- To be able to operate in this room, you must read and undertand the rules and procedures below.
- Lab Safety will be in the Onboarding Quiz

Faculty Safety Notes & Procedures can be viewed in any laboratory and in the Technical Manager's and Laboratory Manager's offices. All students must sign this form before entering any Curtin laboratory.

- In the event of a life threatening emergency dial 0000 from an internal phone or 000 from a mobile phone, then state your name, the building number, room number and type of assistance required. Advise the emergency operator to call Curtin Security for exact directions
- For all other assistance/enquiries, contact Security on ext. 4444 from an internal phone or 92664444 from a mobile, then state the building number, room number and type of Security assistance required.
- Always act responsibly in a laboratory.
- No food (including chewing gum) or beverages (due to risk of potential spillage and shorting) shall be taken into laboratories.
- Appropriate clothing and footwear (e.g. enclosed shoes) shall be worn in all laboratories. Footwear must be non-slip closed in and sturdy.
- Safety glasses, ear protection and dust masks must be worn where applicable. See local Technician.
- Smoking is not permitted on campus property including in or near Curtin University buildings and Carparks.
- Cases and bags shall not be placed on or under laboratory benches.
- Students are not allowed to use any personal devices (including LiPo batteries) in the lab without prior approval from the supervisors.
- All high powered circuits shall be checked by the your supervisor prior to power being switched on.
- Do not leave any circuit switched on longer than necessary for testing. Do not leave active circuits unattended. Always work in pairs if possible.
- On completion of laboratory use, test equipment shall be switched off, bench power shall be switched off, all wiring shall be disconnected and all equipment shall be returned (including test leads) to its original location.
- When using a multimeter, check its range.
- No sitting, standing or lounging on benches or equipment is permitted.
- Students who are affected by alcohol or drugs will be excluded from the laboratory.
- Students shall not enter laboratory areas without the permission of the Lab supervisor or Technical Supervisor.
- A risk assessment, signed off by a Supervisor would be required for accessing the laboratory after working hours
- Visitors are not permitted in the laboratory, unless accompanied by a Technical Supervisor
- No internal repairs and / or pre-set adjustments shall be made to laboratory equipment by students or staff other than the technical staff, unless prior technical staff knowledge and authorisation is sought.
- All faulty equipment shall be reported to your supervisor/technician immediately.
- Software copyright laws shall be adhered to and software applications shall be used for educational purposes only Private use of laboratories / equipment shall not be permitted.
- All Soldering in this lab shall be conducted at designated soldering stations under general supervision of a Technician. Please ensure you read the Safe Work Procedure for soldering at the stations before soldering.
- Student's personal equipment, such as test equipment and computers, shall not be brought into the Faculty without prior technical staff knowledge and authority.
- Equipment shall not be relocated from a laboratory without technical staff knowledge and authority.
- Windows in air conditioned areas shall not be opened. All opened windows in other areas shall be secured.
- Students using this lab are not allowed to give access (open the lab door) to any unauthorised personnel unless prior approval is given by lab managers
- Any student violating the lab rules will have their lab access removed and is required to resubmit the lab rules form
- All students must read the Introduction and Induction document before students are permited to have access into this lab.
- All Mechatronic Engineering forms should be returned to Technical Officers at 205.130.
- All students must prepare to stop work and start to return the instruments, equipment and components to their appropriate places at least **10 min before end of lab time**. This is to allow time for staff to prepare the lab for the next class. All students must make sure that the power supplies are switched off before leaving their work bench. Mains power supplied to the work benches will be cut off at the end of the day when the last staff member exits the lab.

All Safety Rules and Regulations, have been approved by the Dean of Faculty. Breach of these rules and regulations may result in either suspension, expulsion or restitution.

Terms and Conditions

Code of Conduct

PAST does not tolerate any inappropriate behaviour that goes against our Code of Conduct. You must read through PAST's Code of Conduct and agree to it in the Onboarding Quiz.

All members of the Perth Aerospace Student Team shall:

1. Place Safety, Health, and Wellbeing above all else.
2. Comply with all the requirements of venues, Curtin, and the law.
3. Follow all policies and procedures and any amendments to the best of their abilities.
4. Foster growth and mentorship both in the team and in oneself.
5. Be responsible and accountable for all actions taken.
6. All members are expected to respond to messages or communication appropriately in a timely manner
7. Respect each other, valuing and acknowledging the contribution and opinions of others.
8. Treat everyone courteously and fairly.
9. Respect the privacy of all associated individuals, regardless of role, position or status.
10. Members must exercise care in the use of the team's brand materials, including logos, images, and other property, ensuring they are used appropriately and in a manner consistent with the team's brand guideline, values, and image.
    a) Photographs, videos and media containing members must be handled with confidentiality, respect & consent

Media Consent Form

Upon becoming a Recruit, you will be asked to read and sign the media consent form. This is will be made accessible to you through Discord.

What is PAST?

The Perth Aerospace Student Team (PAST) is a team of undergraduate university students working together to build and launch a 1U Cubesat. We get to choose our own payloads, and make all systems from the ground up.

Through teamwork and practical projects, we strive to develop technical and soft skills that foster individual growth and will advance our future career prospects. We value learning, sharing ideas, supporting each other, exploring the unknown, and of course, we all share a fascination for space!

PAST is supervised by the BINAR Space Program, which is the professional space team at Curtin University. BINAR has launched four 1U CubeSats (as of August, 2024).

Our Mission

Provide a safe and supportive environment where students learn through practical projects.

Expand team members' technical and soft skills through active collaboration and sharing knowledge.

Inspire Australia's next generation of space professionals.

Build and launch a 1U CubeSat!

Follow our socials!

linktr.ee/perthaerospace

Instagram
@perthaerospace

LinkedIn & Facebook
@perth-aerospace-student-team

Website
perthaerospace.com.au

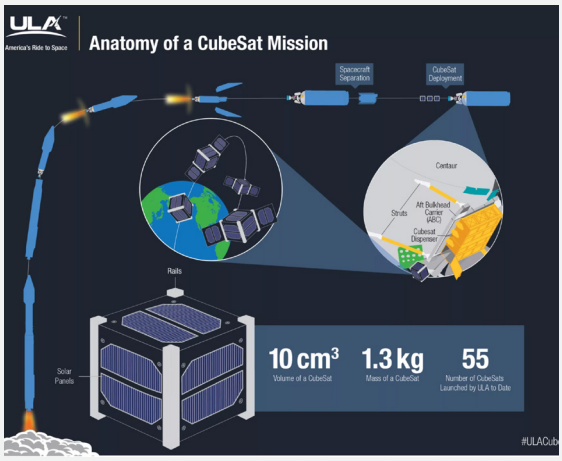
CubeSats 101

Why CubeSats?

- CubeSats are less expensive and simpler to design than large-scale satellites, making them accessible for university teams like us to build and launch into space.
- They are Modular and can be scaled. 1U = 10x10x10cm
- There is so much educational value in making one!

Launch

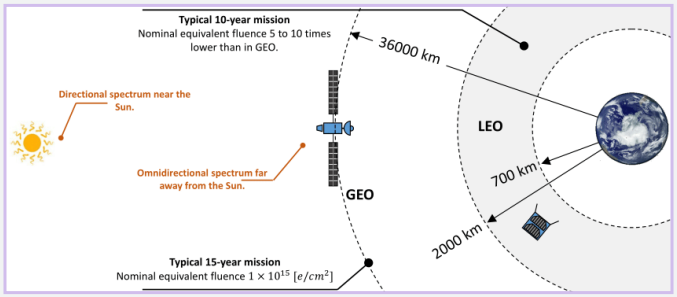
- Launched as secondary payloads through 'ridesharing'
- Launch providers have design specifications CubeSats must meet.
- Deployed through dispensers on the International Space Station (ISS)
- JAXA Specifications: https://humans-in-space.jaxa.jp/en/biz-lab/experiment/facility/ef/jssod/



planetary.org/space-images/ula-cubesat-launch

Orbit

- Low Earth Orbit (LEO)
- Altitude < 2000km (around 400km)
- Orbital period: 90 – 120 minutes
- Orbital life of 2 to 5 years before burning up as it re-enters the earth's atmosphere



Raya-Armenta (2021).

What does it do up there?

The CubeSat's mission is decided by us.
Some examples include:

- Earth Observation: monitoring natural events, taking images, collecting data
- Scientific Research: Testing new technology in space (materials, sensors etc.)
- Technology Demonstrations: Demonstrating the capability of novel designs, demonstrating the capability of a student CubeSat team.

Major Subsystems

Electrical Power System (EPS)

- Manages power generation, storage and distribution for the CubeSat.
- Solar panels, batteries and circuitry

Data Handling and Communications

- Software to control CubeSat operations, store data, process data, facilitate communication between subsystems.

Radio Communications

- Enables the CubeSat to communicate with ground stations on earth.
- Antenna, transceiver, software integration.

Attitude Determination and Control

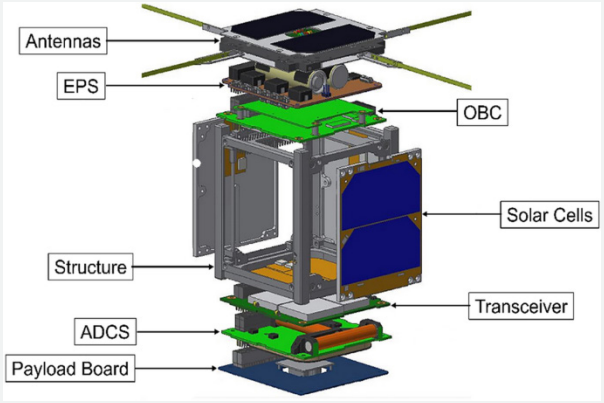
- Uses sensors to determine CubeSat's orientation.
- Actuators to detumble the Cubesat and control orientation so it is pointed in the desired direction.

Structure

- Chassis to house all CubeSat components. Must meet Launch Provider's specifications.
- Mounting solutions and deployable mechanisms.

Payload

- Main mission component – e,g. camera, sensor.
- Collects data to achieve mission objectives.



Alhammadi, A.N., Jarrar, F., Al-Shaibah, M. et al. Effect of finite element model details in structural analysis of CubeSats.

Important Design Considerations

Mission Design

- Impact
- Stakeholders
- Budget
- Available resources
- Meeting launch provider requirements
- Law & Safety Regulations

Engineering Challenges

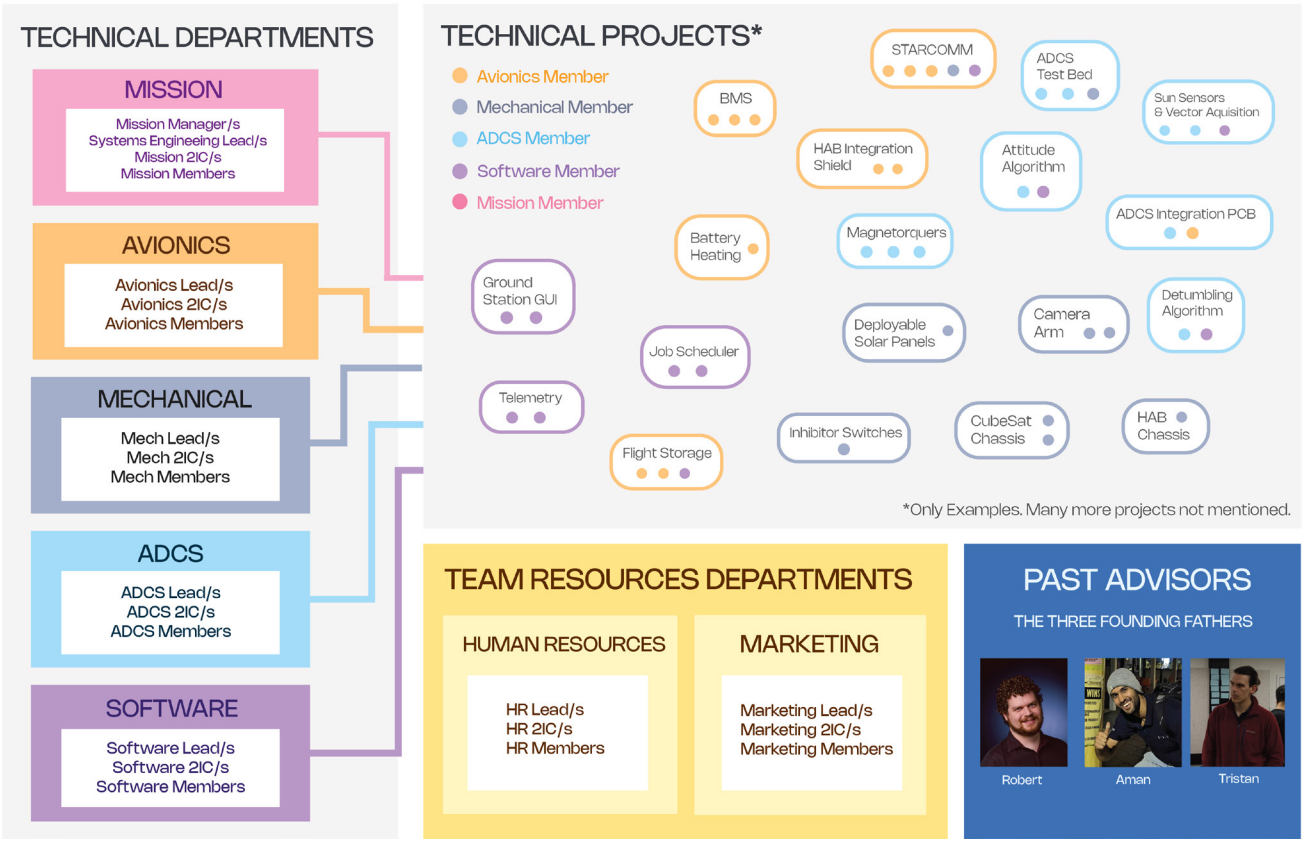
- Project Management
- Constraints e.g. Mass, Size, Computing capability, Shock/Vibration
- System Integration

Space Environment

- Radiation
- Temperature
- Vacuum
- Space Debris

PAST Team Structure

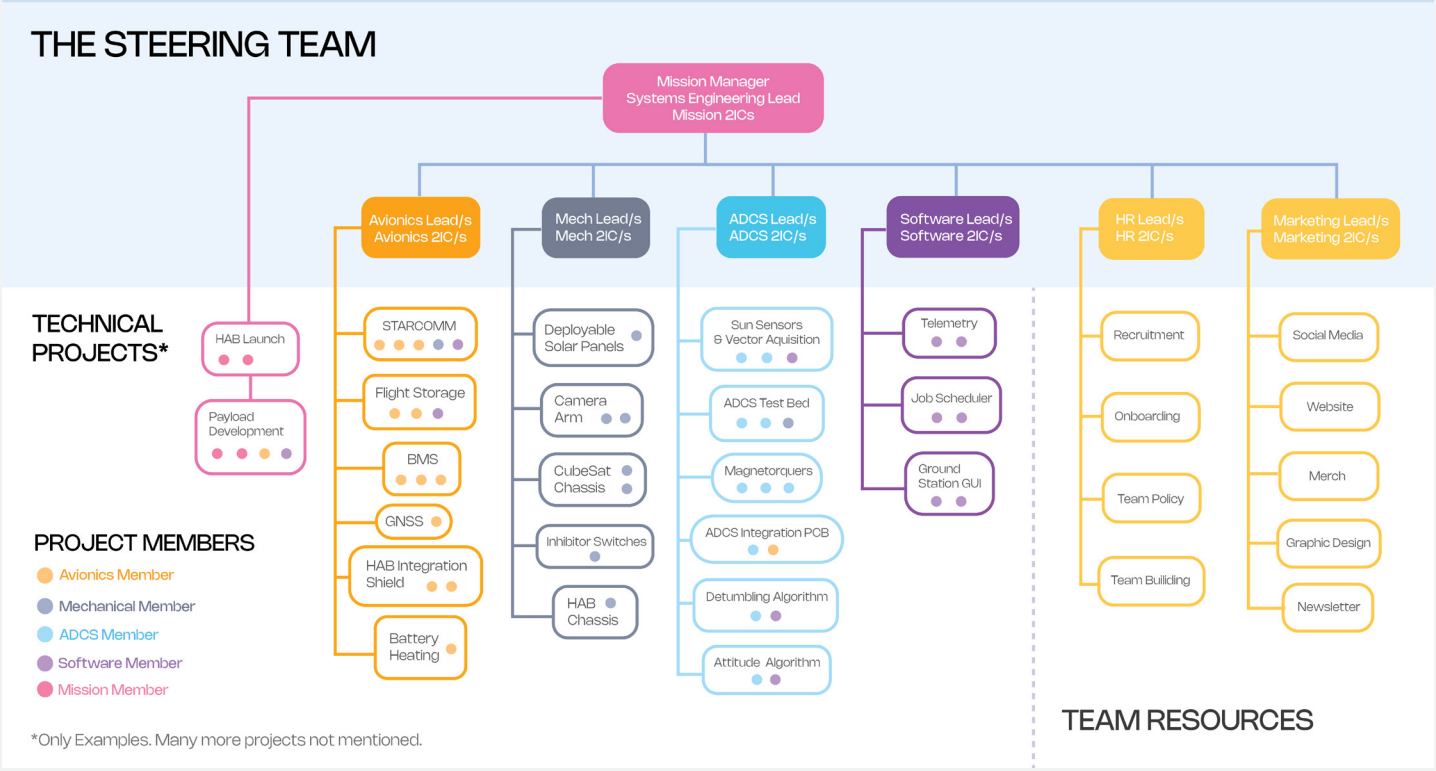
PAST – Team Overview



DEPARTMENTS & PROJECTS

- There are Technical and Team Resources departments
- Departments are a collection of members who specialise in a certain area of knowledge and skills. E.g. Members in the Avionics department are skilled in PCB design and designing electronic systems.
- Members from different departments may collaborate on the same project. E.g. Avionics, Mechanical and Software members may work together on the Radio Communications System.

PAST – Team Structure Tree



THE STEERING TEAM

- Steers the direction of the team to achieve PAST's mission
- Makes high level technical and business decisions
- Collectively manages projects and meet and communicate on a regularly basis
- Supports the growth of team members and serves as a go-to point of contact.
- Organises Monthly Meetings

MISSION MANAGER

- Responsible for manages mission timelines, logistics, law and regulations and interfacing between department leads and Advisors.

SYSTEMS INTEGRATION LEAD

- Responsible for facilitating the technical integration of projects.

DEPARTMENT LEADS

- Responsible for managing projects under their department, providing support for members, running standup meetings, training 2ICs, maintaining department-exclusive directories and ensuring all projects stay on track.

SECOND IN COMMANDS (2ICs)

- 2ICs are chosen and trained by Leads for 3 months. They support leads with management duties, gaining valuable leadership experience which sets them up if they choose to run for a leadership role.

PAST Recruitment Process

Application

- Fill in the application form and wait for a response.

Attend Info Night

All successful applicants will attend the an Induction Night, where there will be:

- Induction to PAST
- QnA Session
- Teamwork Task
- You will be asked to complete and submit a Questionaire at the end.

Onboarding (8 weeks)

- Join the PAST Recruits Discord Server
- Complete the Onboarding Quiz

Technical Onboarding

- Complete Onboarding Project/s of your choice while maintaining a logbook.
- Submit your logbook at the end of 6 weeks for review.
- Your logbook is your portfolio which is used to decide who makes it to the next stage.

Team Resources Onboarding

- Complete Team Resources Onboarding Tasks.
- At the end of 6 weeks, your portfolio of tasks gets reviewed to decide who makes it to the next stage.

Interview

If selected, you will be invited for an interviewto get to know you better and help you integrate into the team.

Provisional Member

Work in the team as a provisional member before the Steering Team signs you off to officially join a department.

Accepted Member

Recruit Expectations

PAST has access to extensive resources, mentorship, unique opportunities for growth – and above all, we are working together to build and launch satellite into space! Hence, we expect that members uphold a high standard of work and meet the following expectations. These are the same expectations of a full PAST member.

We completely understand that university life can be hectic and not everyone may have the time to fully engage with the team. If you ever feel that you're unable to deliver the expectations outlined below, please reach out to HR member.

Commit at least 4 hours per week.

- Try your best to manage your time well and be consistent.
- These hours can include onboarding sessions.

Keep Up to Date.

- Check the Discord Server frequently – at least a few times per week.
- Engage in onboarding sessions.

Communicate.

- Let members know if you will miss onboarding sessions.
- Send updates of your progress to the discord server!
- Inform HR if you will be going on a break etc.

Documentation.

- Your logbook is the main thing that will be used to decide if you make it into the team.
- Keep clear documentation of your project so members can learn from your work and extend from it.

Uphold PAST's Code of Conduct.

- Basically don't do anything that could hurt anyone or intefere with the team's mission.

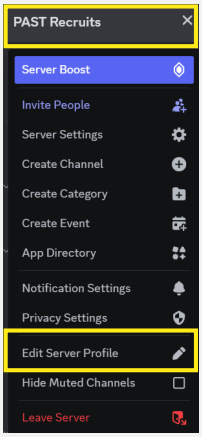
Recruits Discord Server

Discord is PAST's main method of communication. It is expected that you check it regularly so you don't miss any updates.

1. Change Server Nickname

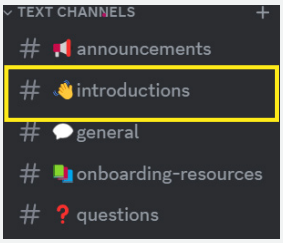
Please change your server nickname to your full (preferred) name.

You can do this by clicking the server name then 'Edit Server Profile' as shown at right.



2. Introduce yourself

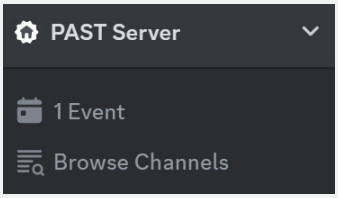
Send a short intro about yourself to the Introduction Channel. At minimum, include your name, course, and a fun/interesting fact about yourself!



3. Get aquainted with the server

Please take the time to learn how to navigate through the server!
Don't be shy to send messages, its a safe and supportive place :)

Events



Regularly check the Events tab for events that Recruits can be involved in. E.g. Onboarding Sessions

Threads

Threads are branches of a text channel for specific topics. They do not show up on your navigation tabs unless you are mentioned, message or follow the thread.

Feel free to make a thread if you are working together with other Recruits on a specific task!

Onboarding

- Onboarding lasts 8 weeks.
- During this period, you will be learning and upskilling yourself through projects.
- These projects are similar to CubeSat/Team Resources projects you could potentially work on in the team.
- Some projects are more guided than others to help you build confidence.
- All work in Onboarding should be recorded in a logbook.
- Your work in Onboarding is your portfolio that will be submitted at the end of the 6 weeks and reviewed to decide who makes it into the next stage of recruitment.
- You are encouraged to discuss projects and work together in the Recruits Discord Server
- There will be weekly Onboarding sessions where you can work with other Recruits and get help from PAST members

Find more info & Onboarding projects on GitHub:
https://github.com/PerthAerospaceStudentTeam/Onboarding/tree/main

Technical Onboarding

- To be eligible to join a technical department you must work on at least one technical onboarding project.
- Your logbook should be evident of work relevant to the department you would like to join.
- You must keep a logbook!!

Team Resources Onboarding

- To be eligible to join a team resources department you must complete at least one of the Team Resources tasks/projects.
- You must keep a logbook!!

Onboarding Quiz

You will be quizzed on your understanding on the information in this handbook. Completing this quiz is a requirement to be eligible to become a member.

You may need to look through the GitHub to find the answers to the questions.

https://forms.office.com/r/JfbmPh8FQe

FAQ

Will there be meetings?

Recruits are not required to attend any formal meetings, but Onboarding sessions will be held in room every Wednesday 12-2pm. This is a good opportunity to work with other Recruits and get support from PAST Members. You might even get the chance to help PAST members with their projects!
You will naturally start integrating with the team more further into the Onboarding period.

What do I put in my logbook?

You should log any research/concept development/learning that you do each week in your logbook. This should be supplemented with evidence (screenshots, references, sketches etc). You may customise it how you like. A logbook template is on GitHub if you need some guidance.

How do I become a PAST member?

Do Onboarding and take pride in maintaining your logbook. At the end of 8 weeks we will inform you if you make it to the next stage of recruitment.

What is a HAB?

High Altitude Balloon. Altitudes of 20-40km in the stratosphere to test in an environment close to space.

Who are the Advisors?

Aman and Tristan advise the team. The BINAR staff also help us. Check them out on their website binarspace.com

Got any questions?

Ping PAST Members on discord or message HR. For any formal inquiries, email past@curtin.edu.au.

We are here to support you and everyone is super eager to help!